Docket No. 95-004M
PATENT APPLICATION

I certify that on the date specified below this correspondence is being transmitted via facsimile to (703) 305-7687 addressed to Examiner Lerner, Group Art Unit 3618.

12/3/03

Conrad O. Gardner

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Conrad O. Gardner	Group Art Unit:	3618
Application No.:	08/896,514	Examiner:	A. Lerner
Filing Date:	06/23/97	Docket No.:	95-004M
		Date:	Dec. 3, 2003

For: Extended Range Motor Vehicle Having Ambient Pollution Processing

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBSTITUTE SECOND SUPPLEMENTAL BRIEF ON APPEAL

Responsive to the Office Letter dated November 24, 2003 noting that the SECOND SUPPLEMENTAL BRIEF filed February 24, 2003 to the Appendix and Amendment dated June 25, 2003 is improper under the new guidelines which became mandatory on July 30, 2003, applicant submits 3 copies of the following Substitute Second Supplemental Brief on Appeal having an Appendix including the status of all claims as required, the exception being the full text of the cancelled claims 1-29 and claims 42-45 of record indicated as not required in a telecon with the Examiner. The fee under 37 C.F.R. §1.17(f) for the appeal brief has been previously paid. Under the caption , "currently amended" are included those presented in applicant's amendment dated June 25, 2003.

Early notification regarding compliance of applicant's SUBSTITUTE SECOND SUPPLEMENTAL BRIEF ON APPEAL within the new guidelines is solicited.

STATUS OF CLAIMS

1. Claims 30-33 stand allowed.

2 Claims 34-37, 40, 41, 46-51 and 53-61 are rejected.

3. Claims 38, 39, and 52 are objected to.

4. Claims 38, 39, 49, 52, and 53 contain allowable subject matter.

REMARKS

Claim Rejections – 35 U.S.C. 112

Claims 46-49, 53, 55, 57, 58, 59, 60, and 61 are stated to be indefinite within the meaning of 35 U.S.C. 112 (Paragraph 6 of the Office Letter)

While claims 46-49 are stated as indefinite, paragraph 7 of the Office Letter commences with Claim 49.

Claim 49 (Paragraph 7 of the Office Letter)

"The period of torque transfer" is believed clear and definite as recited. Patent claim 46 specifies a first torque flow path to traction wheels and a second torque flow path to traction wheels and dependent claim 49 describes a logic control circuit for controlling the periods of transfer in the already defined first and second torque flow paths of the parent claims.

Claim 53 (Paragraph 8 of the Office Letter)

Claim 53 is believed drawn correctly. The limitation proposed in a matter of scope, the suggested limitation to 4-wheel drive, is therefore deemed unnecessary. Further, claim 53 is believed identical in format to the claim indicated as allowable in an interview held with the Examiner on November 10, 1998 (See APPENDIX B).

Claim 55 (Paragraph 9 of the Office Letter)

It is suggested that there is no antecedent basis for "the throttle pedal" in line 6.

Section 2173.05(c) Lack of antecedent basis states "A claim is indefinite when it contains words or phrases whose meaning is unclear."

It is believed that "the throttle pedal" is a term that is not unclear. Also, "If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite." *Ex parte Porter*, 25 U.S.P.Q. 2d 1144, 1145 (Bd. Pat.App. and Inter. 1992).

Claims 55 and 57 (Paragraphs 10, 11, and 12 of the Office Letter

Insufficient antecedent basis fails for the same reasons given with respect to claim 55 above.

Claim 58 (Paragraph 13 of the Office Letter)

The limitation "utilizing an internal combustion engine having a horsepower approximately 20 to 30 percent of the horsepower of an equivalent weight internal combustion only powered vehicle" is believed clear and the metes and bounds of the claim are clearly ascertainable.

Claim 58 describes a hybrid motor vehicle having an electric motor and an internal combustion engine and it is the horsepower of a hybrid vs. an internal combustion only powered vehicle that is being compared and not two different internal combustion only powered vehicles as the Examiner states which is being compared.

Claims 59, 60 and 46 and 61 (Paragraphs 14-16 of the Office Letter)

The terms referenced, "the method", "the cruise mode" and "traction wheels or drive wheels" are not believed indefinite for the same reasons given above with respect to claim 55.

Claims 34-37, 50, 54, and 57-61 stand rejected under 35 U.S.C. 102 (b) over Ellers (Paragraph 18 of the Office Letter)

Claim 34

Claim 34 is not anticipated under 35 U.S.C. 102 over Ellers ('025).

The cruise mode control circuit of claim 34 recites "deactivating said first coupling means driving a cruise mode off condition, and said control circuit activating second coupling means for connecting said combustion engine to an electric generator for charging a battery during the cruise mode off condition." Nothing in Ellers is concerned with this operations parameter of a control circuit. As a consequence, dependent claims 35 and 36 are clearly not anticipated over Ellers.

Claim 37

Claim 37 is clearly not anticipated by Ellers.

"Control means for controlling whether to transfer a driving force generated by an engine to a power generator or wheels... (line 12 on)." This recitation is a feature of no concern to Ellers.

Claim 50

Nothing seen in Ellers which discloses "said cruise mode occurring when rapidly shifting power and speed demands are not occurring for predetermined periods of time (lines 4-5)."

Claim 54

Claim 54 is clearly not anticipated within the meaning of 35 U.S.C. 102, see lines 5-8 "said cruise mode logic circuit responsive to a plurality of vehicle operating parameters including vehicle speed and accelerate pedal information for providing cruise mode logic output control signals for controlling operation of said electric motor and said combustion engine."

Claim 57

The method of operation defined by claim 57 "utilizing the electric motor primarily when conditions for said cruise mode conditions are not satisfied, the cruise mode occurring when rapidly shifting power and speed demands are not occurring" is not shown in Ellers.

Claim 58

Ellers fails to show the method steps claimed including "utilizing an internal combustion having a horsepower approximately 20 to 30 percent of an equivalent weight internal combustion only powered vehicle; and,

Operating said "internal combustion engine at relatively constant speed and load demands in the cruise mode."

Claim 59

Nothing is seen in Ellers relating to the method, via. "causing a fast charge – discharge battery to power the electric motor on throttle demand and transferring power output into electric power conserved in a fast charge-discharge battery when the internal combustion engine continues to run.

Claim 60

The method called out in claim 60 defining operation in the cruise mode, viz. "controlling the operation of the electric motor and combustion engine in response to vehicle operating parameters."

Claim 61

In claim 61, the following feature in lines 10-15 are not seen in Ellers, Viz. "means for coupling said power transfer means for transferring an output power of said electric motor from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the hybrid vehicle; means for uncoupling said power transfer means for transferring an output power of said engine from the output shift thereof the drive wheels of the hybrid vehicle upon starting the hybrid vehicle;"

Claims 37, 40, 46, 47, 55, and 61 stand rejected under 35 U.S.C. 102(b) over Kenyon ('342) paragraph 19 of the Office Letter)

Claim 37

The controller for a hybrid vehicle is defined in claim 37 claims "a control means for controlling whether to transfer a driving force generated by an engine to power a generator or wheels in accordance with a vehicle running state, wherein the control means transfers the driving force generated by; the engine to wheels when said running state is more than a predetermined value, transfers the driving force generated by the engine to the power generator when said running state is less than a predetermined value." No such controller is seen in Kenyon.

Claim 40

Claim 40 is dependent from claim 37 and not anticipated for the same reasons as claim 37.

Claim 46

The logic control circuit of claim 46 is not seen in Kenyon.

Claim 47

Dependent claim 47 is dependent from claim 46 and not anticipated at least for the same reasons as claim 46.

Claim 55

The method of claim 55 including step a. viz. "rapidly capturing power from a continuously running low horsepower internal combustion engine to charge a fast charge-discharge battery without loss of said power" is not seen in Kenyon.

Claim 61

In claim 61, "means for coupling said power transfer means for transferring an output power of said electric motor from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the hybrid vehicle, means for uncoupling said power transfer means for transferring an output power of said engine from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the hybrid vehicle" is not seen in Kenyon. Further, claim 61, currently rejected under 35 U.S.C. 112 and 35 U.S.C. 102(b), was previously amended to correct for indefiniteness and subsequently allowed in the Office Letter dated 08/29/00 (paper number 40). See also the Office Letter dated 11/13/00 (paper number 42).

Claims 37, 40, 50, 51, 54, 55, and 57-60 stand rejected over Lynch et al. ('795) under 35 U.S.C. 102(b)

Claim 37

The control means of claim 37 is not shown in Lynch et al., viz. "control means for controlling whether to transfer a driving force generated an engine to a power generator or sheels in accordance with a vehicle running state, wherein the control means transfers the d riving force generated by the engine to wheels when said running state is more than a predetermined value, transfers the driving force generated by the engine to the power generator when said running state is less than a predetermined value." Therefore, the rejection of claim 37 under 35 U.S.C. 102(b) is incorrect.

Claim 40

Claim 40 is dependent from claim 37 and allowable for the same reasons as claim 40.

Claim 50

Nothing is seen in Lynch et al. to anticipate the limitation in claim 50, viz. "said cruise mode occurring when rapidly shifting power and speed demands are not occurring for predetermined periods of time" and therefore Lynch et al. is not anticipatory of claim 50.

Claim 54

The cruise mode logic control circuit of claim 54, viz. "said cruise mode by logic control circuit responsive to a plurality of vehicle operating parameters including vehicle speed and accelerator pedal information for providing cruise mode logic output control signals for controlling operation of said electric motor and said combustion engine" is not anticipated by Lynch et al. under 35 U.S.C. 102(b).

Claim 55

The method step (a) of method claim 55, viz. "by rapidly capturing power from a continuously running low horsepower internal combustion engine to charge a fast charge-discharge battery without loss of said power, and..." is not shown in Lynch et al.

Claim 57

"Utilizing the electric motor power primarily when conditions for said cruise mode conditions are not satisfied, the cruise mode occurring when rapidly shifting power and speed demands are not occurring" is a feature not anticipated by Lynch et al. under 35 U.S.C. 102(b).

Claim 58

The method of claim 58 including the step of "a. utilizing an internal combustion engine having a horsepower approximately 20 to 30 percent of the horsepower of an equivalent weight internal combustion only powered vehicle;" is not disclosed in Lynch et al.

Claim 59

Steps a. and b. in the method of claim 59 are not seen in Lynch et al., which is therefore not anticipatory.

Claim 60

"Controlling operation of the hybrid vehicle said cruise mode including controlling the peration of the electric motor and internal combustion engine in response to vehicle operating parameters is not seen in Lynch et al.

**Claim 41 stand rejected over Ellers under 35 U.S.C. 103(a)
(Paragraph 22 of the Office Letter)**

Claim 41 is dependent from claim 40 which is dependent from claim 37. The system of Ellers is entirely deficient in satisfying energy storage in contrast to the claimed system. Claim 37 clearly distinguishes a control system neither seen, taught or suggested by Ellers. See the last paragraph on page 5 of the affidavit of Philip Malte of record titled, *Appendix C* included in applicant's BRIEF ON APPEAL, copy attached.

**Claim 56 stands rejected over Lynch et al. under 35 U.S.C. 103
(Paragraph 3 of the Office Letter**

Lynch et al. describes a motor-generator operating as a load leveler where "the batteries are only required to furnish tractine power to the drive system for short periods of time (col. 2, lines 24-27). Increase in engine RPM causes the internal combustion engine of Lynch et al. to operate a motor-generator as a generator to charge storage batteries 14 (see col. 8, lines 60-66) in contrast to clause b. of claim 56 where a fast charge-discharge battery is charged when the internal combustion engine is "<u>not</u> employed to drive the motor vehicle." Claim 56 calls for a system neither taught, suggested or made obvious by the system of Lynch et al. within the meaning of 35 U.S.C. 103(a). It should be further noted that for purposes of the load level concept design of Lynch et al., "standard automotive starting batteries with a large number of thin plates" are utilized (see col. 5, lines 18-20).

**Claim 48 stands rejected over Kenyon in view of Ellers under 35 U.S.C. 103(a)
(Paragraph 24 of the Office Letter**

Claim 48 is dependent from claim 46. Kenyon fails to show "a logic control circuit for interrupting torque flow path without interrupting torque flow in said first torque flow path without interrupting operation of said engine during disengagement of said clutch and application of torque through said second torque flow path to the traction wheels of the hybrid vehicle.

The feature of Ellers concerns low battery operation as a series hybrid and it is not understood how this teaching could be applied to the parallel hybrid system of Kenyon, and thus obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. 103. Further, claim 48 relates to the condition of an inoperable electric motor, not low battery determination as Ellers system operation.

Conclusion

The Examiner's critique of this application is appreciated, however, no new prior art references have been cited and it is believed the status of all claims including the rejected claims on appeal in Appendix A are clear, definite, and clearly distinguish patentably over the prior art for the reasons given herein. As a consequence, it is believed the Examiner, upon careful review, will find the application in condition for allowance thereby avoiding further unnecessary proceedings before the Board of Appeals.

Respectfully submitted,

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APPENDIX

Claims 1-29 (Canceled)

30. (Allowed) In combination, a hybrid motor vehicle comprising:

an electric motor connected to a first pair of wheels;

a cruise mode control circuit having preprogrammed cruise mode operating conditions, said control circuit automatically activating first coupling means for connecting a combustion engine to a second pair of wheels during a cruise mode on condition and deactivating said first coupling means during a cruise mode off condition, and said control circuit activating second coupling means for connecting said combustion engine to an electric generator for charging a battery during the cruise mode off condition;

a CO detector mounted on said vehicle for measuring the C level in the vicinity of said vehicle;

an interactive information network located at a location remote from said motor vehicle, said network having receiver means for receiving said signal from said vehicle and transmitter means for transmitting a control signal to a receiver mounted on said vehicle when the measured CO level exceeds a predetermined level; and

control means responsive to the received control signal from said network for switching the cruise control circuit to the cruise mode off condition.

31. (Allowed) The combination as set forth in claim 30, further including an exhaust emission analyzer for measuring the pollutant level of exhaust emissions from said combustion engine and connected to said vehicle transmitter for transmitting a signal indicative of the measured pollutant level to said network receiver means and said network transmitting said control signal to said vehicle mounted receiver when the measured pollutant level exceeds a predetermined level for switching the cruise control circuit to the cruise mode off condition.

32. (Allowed) In combination, a hybrid motor vehicle comprising:

an electric motor connected to a first pair of wheels;

a cruise mode control circuit having preprogrammed cruise mode operating conditions, said control circuit automatically activating first coupling means for connecting a combustion engine to a second pair of wheels during a cruise mode on condition and deactivating said first coupling means during a cruise mode off condition, and said control circuit activating sedond coupling means for connecting said combustion engine to an electric generator for charging a battery during the cruise mode off condition;

an exhaust emission analyzer for measuring the pollutant level of exhaust emissions from said combustion engine;

a vehicle mounted transmitter for transmitting a singla indicative of the measured pollutant level;

an interactive information network located at a location remote from said motor vehicle, said network having receiver means for receiving said signal from said vehicle and transmitter means for transmitting a control signal to a receiver mounted on said vehicle when the measured pollutant level is above a predetermined level; and

control means located in said vehicle responsive to the received control signal from said network for switching the cruise control circuit to the cruise mode off condition.

33. (Allowed) The combination as set forth in claims 32, further including a C detector mounted on said vehicle and connected to said vehicle transmitter for transmitting a signal indicative of the C level in the vicinity of said vehicle to said network receiver means and said network transmitting said control signal to said vehicle mounted receiver when the measured CO level exceeds a predetermined level for switching the cruise control circuit to the cruise mode off condition.

34. (Previously added) In combination, a hybrid motor vehicle comprising:

an electric motor connected to a first pair of wheels;

a cruise mode control circuit having preprogrammed cruise mode operating conditions, said control circuit automatically activating first coupling means for connecting a combustion engine to a second pair of wheels during a cruise mode on condition and deactivating said first coupling means during a cruise mode off condition, and said control circuit activating second coupling means for connecting said combustion engine to an electric generator for charging a battery during the cruise mode off condition;

said combustion engine running in an optimum mode at substantially constant speed and power output level.

35. (Previously added) The combination according to claim 34 wherein said cruise mode off condition for charging a battery comprises a speed less than a predetermined value.

36. (Previously added) The combination according to claim 34 wherein in the event of an inoperable electric power condition under cruise mode off condition, said combustion engine is connected by said first coupling means to said second pair of wheels.

37. (Previously added) A controller of a hybrid electric vehicle having an engine (22) and a motor (12) for controlling driving of the engine (22) and the motor (12), comprising:

a battery (58) for supplying electric power to the motor (12) ;

motor-generated driving force transfer means (14) for transferring the driving force generated by the motor (12) to wheels (18);

a power generator (78) driven by the engine (22) to supply generated electric power to the battery (58);

engine-generated driving force transfer means (75) for transferring the driving force generated by the engine (22) to the wheels (28);

means for detecting a vehicle running state (44) ; and

control means (30) for controlling whether to transfer a driving force generated by an engine (22) to a power generator (78) or wheels (28) in accordance with a vehicle running state, wherein the control means (30) transfers the driving force generated by the engine (22) to wheels (28) when said running state is more than a predetermined value, transfers the driving force generated by the engine (22) to the power generator (78) when said running state is less than a predetermined value.

38. (Currently amended)A controller according to claim 37 wherein said control means (30) sets a period for transferring driving forces generated by the engine (22) to wheels (28) when said running state changes from a value less than a predetermined value ~~to a value larger than the predetermined value~~ to a value larger than the predetermined value.

39. (Previously added) A controller according to claim 38 wherein said period is about 45 seconds.

40. (Previously added) A controller according to claim 37 wherein said running state is vehicle speed.

41. (Previously added) A controller according to claim 40 wherein said vehicle speed is about 40 miles per hour.

Claims 42-45 (Canceled)

46. (Currently amended) A hybrid vehicle power train comprising an engine and an electric motor;

a first torque <u>flow</u> path including a clutch and transmission coupled between said engine and traction wheels of the hybrid vehicle;

a second torque flow path coupled between the electric motor and traction wheels of the hybrid vehicle; and,

a logic control circuit for interrupting torque flow in said first torque flow path without interrupting operation of said engine during disengagement of said clutch and application of torque through said second torque flow path to the traction wheels of the hybrid vehicle.

47. (Currently amended) A hybrid vehicle power train according to claim ~~3~~46 wherein said traction wheels comprise four-wheel drive.

48. (Previously added) A hybrid drive vehicle power train according to claim 46 wherein in the event of an inoperable electric motor, said first torque flow path provides torque to traction wheels of the hybrid vehicle.

49. (Previously added) A hybrid vehicle power train according to claim 46 wherein said logic control circuit controls the period of torque transfer between said first and second torque flow paths to traction wheels of the hybrid vehicle.

50. (Previously added) A hybrid motor vehicle comprising in combination:

an electric motor propulsion system which shifts to combustion engine propulsion for vehicle operation when cruise mode is reached;

said cruise mode occurring when rapidly shifting power and speed demands are not occurring for predetermined periods of time.

51. (Previously added) A hybrid motor vehicle comprising in combination:

an engine;

an electric motor;

a storage device;

said electric motor powering said hybrid vehicle at lower speeds;

said engine powering said vehicle at higher speeds; and said engine operatively connected through a charging path for charging said battery at lower speeds.

52. (Previously added) A hybrid motor vehicle according to claim 50 wherein said speed demands do not drop below 40 mph for predetermined time periods of 45 seconds.

53. (Previously added) In combination in a motor vehicle having a pair of wheels at one end of the vehicle and a pair of wheels at an opposite end of the vehicle:

an electric motor for powering one of said pair of wheels;

a low power combustion engine for powering one of said pair of wheels;

a battery for storing electrical energy;

a cruise mode control having preprogrammed cruise mode operating conditions which includes a vehicle operating speed exceeding a predetermined level and for a predetermined time interval, said control circuit automatically coupling said electric motor to one of said pair of wheels when said cruise mode operating conditions have been satisfied, coupling said combustion engine to one of said pair of wheels when said cruise mode operating conditions have been satisfied, and

decoupling said combustion engine from said one pair of wheels when said cruise mode operating conditions have not been satisfied;

said cruise mode control circuit adapted to maintain said combustion engine in a constant on mode, to couple said combustion engine to an electric power generator for charging said battery when cruise mode conditions have not been satisfied, and to decouple said combustion engine from said electric power generator when said cruise mode conditions have been satisfied.

54. (Previously amended) In combination in a hybrid vehicle;

an electric motor;

a combustion engine;

a cruise mode logic control circuit;

said cruise mode logic control circuit responsive to a plurality of vehicle operating parameters including vehicle speed and accelerator pedal information for providing cruise mode logic output control signals for controlling operation of said electric motor and said combustion engine.

55. (Previously added) A method of operating a hybrid vehicle having electric motor and internal combustion engine power comprising:

a. rapidly capturing power from a continuously running low horsepower internal combustion engine to charge a fast charge-discharge battery without loss of said power, and,

b. providing instant powerful acceleration by operator depression of the throttle pedal to provide electric propulsion while in the cruise mode when the speed of the vehicle is dropping.

5~~5~~6. (Currently amended) A method of operating a hybrid motor vehicle having an electric motor and an internal combustion engine comprising:

a. operating the internal combustion engine within a small range of speeds about its most efficient operating speed from a power and pollutant output standpoint; and,

b. utilizing the internal combustion engine to charge a nickel cadmium fast charge-discharge battery when the internal combustion engine is not employed to drive the motor vehicle.

5~~6~~7. (Currently amended) In the method of operating a hybrid motor vehicle having internal combustion engine power and electric motor power in the cruise mode and when cruise mode conditions are not satisfied;

a. utilizing the internal combustion engine power in said cruise mode and utilizing the electric motor power primarily when conditions for said cruise mode conditions are not satisfied, the cruise mode occurring when rapidly shifting power and speed demands are not occurring.

58. (Previously added) A method of operating a hybrid motor vehicle having an electric motor and an internal combustion engine comprising:

a. utilizing an internal combustion engine having a horsepower approximately 20 to 30 percent of the horsepower of an equivalent weight internal combustion only powered vehicle; and,

b. operating said internal combustion engine at relatively constant speed and load demands in the cruise mode.

59. (Previously added) In combination in the method of operating a hybrid vehicle having an electric motor and an internal combustion engine:

a. causing a fast charge-discharge battery to power the electric motor on throttle demand; and,

b. transferring power output into electric power conserved in a fast charge-discharge battery when the internal combustion engine continues to run.

60. (Previously amended) A method of operating a hybrid motor vehicle having an electric motor and an internal combustion engine operable in the cruise mode comprising:

controlling operation of the hybrid vehicle in said cruise mode including controlling the operation of the electric motor and internal combustion engine in response to vehicle operating parameters.

61. (Previously amended) A hybrid vehicle comprising:

an engine for propelling the hybrid vehicle, said engine having an output shaft;

power transfer means for transferring an output power of said engine from the from the output shaft thereof to drive wheels of the hybrid vehicle;

an electric motor for propelling the hybrid vehicle, said electric motor having an output shaft;

power transfer means for transferring an output power of said electric motor from the output shaft thereof to drive wheels of the hybrid vehicle;

means for coupling said power transfer means for transferring an output power of said electric motor from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the hybrid vehicle;

means for uncoupling said power transfer means for transferring an output power of said engine from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the hybrid vehicle; and,

means for coupling said power transfer means for transferring an output power of said engine from the output shaft thereof to drive wheels of the hybrid vehicle when the hybrid vehicle increases above a predetermined speed.

APPENDIX B

Interview with Examiner Mar dated November 2, 1998.

Interview Summary	Application No. 08/896,514	Applicant(s) Conrad O. Gardner
	Examiner Michael Mar	Group Art Unit 3611

ll participants (applicant, applicant's representative, PTO personnel):

(1) *Michael Mar* (3) ______

(2) *Conrad Gardner* (4) ______

Date of Interview *Nov 2, 1998*

Type: ☐ Telephonic ☒ Personal (copy is given to ☒ applicant ☐ applicant's representative).

Exhibit shown or demonstration conducted: ☐ Yes ☒ No. If yes, brief description:

Agreement ☐ was reached. ☒ was not reached.

Claim(s) discussed: *46 and 50*

Identification of prior art discussed:

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:

A claim defining the cruise mode operation and the hybrid vehicle together with a terminal disclaimer would be allowable.

The other claims will be reviewed subject to an updated search.

(A fuller description, if necessary, and a copy of the amendments, if available, which the examiner agreed would render the claims allowable must be attached. Also, where no copy of the amendents which would render the claims allowable is available, a summary thereof must be attached.)

1. ☐ It is not necessary for applicant to provide a separate record of the substance of the interview.

Unless the paragraph above has been checked to indicate to the contrary, A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION IS NOT WAIVED AND MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a response to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW.

2. ☐ Since the Examiner's interview summary above (including any attachments) reflects a complete response to each of the objections, rejections and requirements that may be present in the last Office action, and since the claims are now allowable, this completed form is considered to fulfill the response requirements of the last Office action. Applicant is not relieved from providing a separate record of the interview unless box 1 above is also checked.

Michael Mar

Examiner Note: You must sign and stamp this form unless it is an attachment to a signed Office action.

46

In combination in a motor vehicle having a pair of wheels at one end of the vehicle and a pair of wheels at an opposite end of the vehicle:

an electric motor for powering one of said pair of wheels;

a low power combustion engine for powering one of said pair of wheels:

a battery for storing electrical energy: and

a cruise mode control having preprogrammed cruise mode operating conditions which includes a vehicle operating speed exceeding a predetermined level and for a predetermined time interval, said control circuit automatically coupling said electric motor to one of said pair of wheels when said cruise mode operating conditions have not been satisfied, coupling said combustion engine to one of said pair of wheels when said cruise mode operating conditions have been satisfied, and decoupling said combustion engine from said one pair of wheels when said cruise mode operating conditions have not been satisfied;

said cruise mode control circuit adapted to maintain said combustion engine in a constant on mode, to couple said combustion engine to an electric power generator for charging said battery when said cruise mode conditions have not been satisfied; and to decouple said combustion engine from said electric power generator when said cruise mode conditions have been satisfied.

APPENDIX C

Affidavit of Philip C. Malte Under Rule 132

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	GARDNER, Conrad O.	Group Art Unit:	3611
Application No.:	08/896,514	Examiner:	Michael Mar
Filing Date:	June 23, 1997	Docket No.:	95-004M
		Date:	December 9, 1999

For: EXTENDED RANGE MOTOR VEHICLE HAVING AMBIENT POLLUTANT PROCESSING

AFFIDAVIT OF PHILIP C. MALTE UNDER RULE 132

Philip C. Malte, being duly sworn, deposes and states:

1. Philip C. Malte is Professor of Mechanical Engineering at the University of Washington, Seattle, Washington. This position has been held since 1983. In the 10-year period prior to 1983, Philip C. Malte was Assistant Professor of Mechanical Engineering at Washington State University, Pullman, Washington, Associate Professor of Mechanical Engineering at Washington State University, and Associate Professor of Mechanical Engineering at the University of Washington. Additional positions held include Engineer (Martin Marietta Corporation), Senior Engineer (Rohr Industries), Senior Engineer and Chief Consulting Engineer (Energy International, Inc), and US Department of Energy (Faculty Rotator).

2. Philip C. Malte studied engineering at The University of Michigan, Ann Arbor, Michigan. The degrees received include PhD in 1971, Masters of Science in 1966, and Bachelor of Science in 1964.

49

3. Philip C. Malte has performed research and published in the field of Combustion since 1970. Focus of the research has been on the generation and control of pollutants in combustion systems, especially in gas turbine engines and piston engines.

4. Philip C. Malte has taught university courses on combustion engines and on combustion science and technology for approximately 25 years. The University of Washington course numbers are ME481 and ME424. Other courses taught deal with energy conversion.

5. Philip C. Malte has developed and maintained laboratories that support research and teaching on combustion and combustion engines. The Internal Combustion Engines Laboratory at the University of Washington includes dynamometer test stands with engines, including a multi-cylinder gasoline engine, a single-cylinder spark ignition engine, and two single-cylinder diesel engines.

6. Teaching on engines by Philip C. Malte has included traditional spark ignition and diesel engines, improvements in combustion for these engines, and alternatives to these engines. The latter topic includes hybrid-electric engines. Research on engines has dealt with combustion for land-based gas turbine engines and large-bore spark ignition engines, and alternative fuels for these engines.

7. Philip C. Malte is a Member of the American Society of Mechanical Engineers (ASME), The Combustion Institute (CI), and the Society of Automotive Engineering (SAE).

8. Publication by Philip C. Malte has occurred in the journals and proceedings of the ASME and the CI. Additionally, SAE papers have been written.

50

9. Familiarity with hybrid-electric propulsion for automobiles has been gained by Philip C. Malte through teaching and study of the subject.

10. Philip C. Malte keeps abreast of the state of the art in combustion engines and related fields.

11. The Examiner has stated that:

The definitions of the systems in claims 34, 35, 37, 40 & 50-54 are unpatentable over Ellers.

Ellers discloses a pre-programmed control 25 which activates the internal combustion engine 21 and the electric torque converter 35 for coupling the engine to the second pair of wheels 15 and 17 when the vehicle approaches a pre-selected desirable speed of 55 mph. Since Ellers describes the pre-selected desirable speed at which the engine is activated as a cruising speed (col. 1, lines 55-58), after this speed has been reached, the vehicle is in a condition which constitutes a "cruise mode on condition". When the speed drops below 55 mph, the control decouples the engine from the second pair of wheels. This condition constitutes a "cruise mode off condition". The control could also activate a second coupling 65 for connecting the engine to an electric generator 63 for charging a battery 5 during the "cruise mode off condition". The internal combustion engine 21, being a small engine with no throttle control, would operate at a constant speed for maximum efficiency and minimum pollution. With respect to claims 42-44, note the control system for using only the electric motor at speeds below the pre-selected desirable speed of 55 mph. As the vehicle approaches the pre-selected desirable speed, the control system activates the internal combustion engine and disconnects electric power to the electric motor. Since the electric motor is always operating below the pre-selected desirable speed, the speedometer 67 would function as a display device for indicating when the electric motor is powering the hybrid vehicle at the lower speeds. With respect to claims 37 and 40, the engine drives the wheels when the vehicle is above the pre-selected desirable speed. When the battery charge is

51

low, the control switches to a second mode in which power from the engine is transferred to the generator.

It would have been obvious to program the control circuit of Ellers to always connect the engine to the generator during the cruise mode off condition in order to maintain a fully charged battery. With respect to claim 50, since the cruise mode is set only when the vehicle has reached a predetermined speed, it would have been obvious to activate the cruise mode only after a predetermined period of time in which rapidly shifting power and speed demands have not occurred in order to provide a consistent speed for the cruise mode. With respect to claim 51, since Ellers teaches using the engine to drive the generator whenever the charged state of the battery is too low, it would have been obvious to activate the engine for charging the battery, even during periods of low speed when the electric motor is used to power the vehicle.

12. Regarding claims 34, 35, 37, 40, and 50-54, Philip C. Malte states:

Reading of Ellers (#4,923,025) strongly suggests the Internal Combustion Engine (ICE) does not come into play (i.e., does not drive a set of wheels) until the vehicle has reached a desirable highway cruising speed, such as 55 mph. At this point, the electric drive of a set of wheels is shut off. Thus, at about 55 mph and above, the ICE will drive the vehicle, and below about 55 mph, the Electric Motor (EM) will drive the vehicle.

The claims of Gardner involve a cruise mode condition. The cruise mode condition consists of a desirable vehicle speed and a desirable steadiness of vehicle speed and power. This is much different than the desirable highway speed of Ellers. Gardner allows the ICE to come into play at urban driving conditions, not just highway driving speed. An example of the Gardner condition would be urban driving at about 40 mph vehicle speed. Additionally, Gardner requires a steadiness of operation in order for the ICE to drive the vehicle. This will allow a relatively small ICE to be used. Ellers, on the other hand, never mentions

52

steadiness of operation. Furthermore, by Ellers, one would be strongly inclined to use a fairly large ICE, since it will be used for all running above about 55 mph – though the ICE could be aided by the re-energized electric motor for a high rate of acceleration of the vehicle on the highway. It is quite unlikely the ICE of Ellers will operate with as high of efficiency as the Gardner ICE, and it is unlikely Ellers' ICE will yield as much reduction in vehicle emissions as Gardner's ICE.

Reading of Ellers strongly suggests charging of the electric-drive battery by the ICE only occurs when the battery, on 6-volts basis, has a voltage of less than 5.25 volts. This is a significant drawback of the Ellers system. This drawback is brought out by the statement in Ellers: "It has been found that if the vehicle of the present invention is driven approximately 30% of its mileage over 55 mph (on ICE) the batteries would never need charging from an outside source." Gardner overcomes this difficulty. That is, the ICE is used to charge the batteries when the vehicle is in cruise-off mode condition. Gardner proposes a significantly more robust electric-drive battery recharging system. It is unlikely Gardener's system will require external charging, even if the vehicle is driven primarily in the urban environment.